Women in Nontraditional Jobs

IS THERE A RISK FOR MUSCULOSKELETAL INJURY?

by Carolyn L. Blue, MSN, RN

Musculoskeletal disorders are a leading cause of disability among workers in the United States, affecting nearly one half of the nation's work force (U.S. Department of Health and Human Services, 1986). In 1988, work related injuries, including soft tissue and musculoskeletal injuries, occurred at a rate of 8.3 per 100 workers (U.S. Department of Labor, 1990). Gender data are limited. However, the rate of fractures, dislocations, and sprains severe enough to require medical attention or activity restriction per 100 persons 18 to 44 years old was 12.6 for males and 7.5 for females during 1990 (U.S. Department of Health and Human Services, 1991).

Human biological factors such as physical size, strength, range of motion, endurance, and the integrity of the musculoskeletal system frequently contribute to injury when job demands exceed the worker's physical capabilities (U.S. Department of Health and Human Services, 1986). Equal Employment Opportunity Legislation and affirmative action are integrating women into nontraditional jobs previously dominated by men (Harlan, 1982; Lederer, 1981). A concern resulting from this movement of women into jobs "designed for male bodies" is the risk of injury (Messing, 1991).

The purposes of this article are to provide a background for the female movement into male dominated jobs; to review research concerning biological differences of men and women; and, to suggest solutions for the prevention of musculoskeletal injury to women and a direction for future research.

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BACKGROUND ISSUES

Women's participation in the U.S. work force has been shaped by a number of social, political, and economic changes. During the 19th century, the U.S. economy shifted from agriculture to industry, moving production from farms into factories. Although most "true" women remained in the home, poor women could not afford to stay home and joined the industrial labor force (Kessler-Harris, 1982; Renzetti, 1992). The belief that women who were "ladylike" would only work until married was used to justify lower wages and menial, repetitive jobs; therefore, the higher paying, permanent jobs were reserved for men (Fox, 1984; Renzetti, 1992; Sidel, 1986).

In the early part of the 20th century, the labor structure changed from goods producing to service producing (U.S. Bureau of the Census, 1975, 1986). With the introduction of mechanization and more efficient management, women moved

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into less strenuous jobs in the service area which included teachers, nurses, telegraph and telephone operators, waitresses, and clerks (Kessler-Harris, 1982; Reskin, 1990).

During World War II the American economy improved and, with men going to war, labor shortages made jobs previously held only by men available for women. Support services such as child care and minor changes in job ergonomics were made so that women could physically take on jobs in heavy industry (Gluck, 1987). The experience of working during the war "pointed the way to a greater degree of choice for American women" (Anderson, 1981). However, when the war ended, the returning servicemen took back their jobs. Under tremendous social pressures, women returned to the traditionally female dominated service sector and to their roles in the home (Fox, 1984; Renzetti, 1992).

Women have continued to work despite negative social attitudes toward women's employment since World War II. By 1991, women made up 57.7% of the civilian work force, up from 20% in 1900 (U.S. Bureau of the Census, 1975, 1991). However, women have remained largely in traditional female service and industrial piecework jobs.

Several factors account for women's participation in the labor force: economic necessity; changes in childbearing and child rearing practices; changing husbands' attitudes toward wives' employment; and, grassroots women's movements that encourage women to work in all types of jobs (Fox, 1984). Primarily, women are opting for traditionally male dominated jobs because of organizational changes in worksite settings and because these jobs have better pay, fringe benefits, security, training, and promotional opportunities than traditionally female jobs (Lederer, 1981; Palmer, 1990).

Until the 1960s, the legal system restricted women's work to the "kind of work women could do" (Renzetti, 1992). For example, women were prohibited from lifting more than a prescribed maximum weight (Renzetti, 1992; Reskin, 1986). To combat the restrictions placed on women, feminist and civil rights movements motivated the federal government to legislate against sexual discrimination in the worksite.

Title VII of the Civil Rights Act of 1964 was the first important legislation dealing with discrimination, making it unlawful to discriminate against persons because of race, color, religion, or national origin in hiring, determining wages and benefits, training, and assigning jobs. Gender was added to the list in 1968 through a second important federal policy, Executive Order 11246, better known as Affirmative Action (Fox, 1984; Renzetti, 1992). As a result of these pieces of legislation, employers are required to recruit, train, and promote women and minorities (Renzetti, 1992).

Since the 1970s, there has been a consistent but very modest decline in occupational sex segregation (Jacobs, 1989; Kessler-Harris, 1982). One of the reasons women have been slow to take traditional men's jobs is a negative stereotype about women's ability to do the job because of biological differences. Because of this stereotype, women are concentrated in jobs that are most suitable to these differences (Messing, 1982; Meyer, 1978; Palmer, 1990). Women, to a lesser extent than in the past, still question their own ability to carry out masculine motor tasks (Rudisill, 1988). However, women working in nontraditional job generally are accepted by their supervisors (Palmer, 1990; Reskin, 1988; Wharton, 1987).

The physical demands of many jobs create an occupational risk for musculoskeletal system injury. Important etiologic factors in the development of musculoskeletal disorders include manual handling of materials, repetitive motions, and vibrations (U.S. Department of Health and Human Services, 1983). Important concerns are whether women working in many of these jobs are equal to men in physical capacity and, if not, are women in nontraditional male jobs at risk for musculoskeletal injury in the work setting?

PHYSICAL FACTORS

It is generally agreed that men and women are different in stature and body composition (Mackay, 1984; Wilmore, 1988). Females are, on average, shorter than men of similar stature and have more adipose tissue. Females have narrower shoulders and wider hips than males. Also, females proportionally have shorter legs and arms than their male counterparts (Mackay, 1984).

Strength

Strength is defined as "the maximum ability to apply or to resist force" (Wilmore, 1988). Females have been found to be 40% to 75% weaker than males in upper body strength, but only 5% to 30%

weaker in lower body strength (Falkel, 1986; Wilmore, 1988). The higher prevalence of shoulder-neck disorders among women in industry has been associated with their weaker muscle strength in the upper body (Kilbom, 1988).

Depending on the task, studies have found significant differences in levels of strength between genders; therefore, results should be treated with caution (Pheasant, 1983). It has been suggested that sex differences in muscular strength are accounted for by the difference in muscle size (Bishop, 1987; Falkel, 1985) and not by differences in the physiology of muscle tissue (Wilmore, 1988). Both strength and endurance were similar for both genders when body composition and size were controlled (Falkel, 1985; Hosler, 1982).

In a study of firefighter physical performance, females demonstrated lower scores than males in all physical tasks. However, the females who participated in the study had a higher percentage of body fat and lower absolute fat free weight than the men (Misner, 1987). Muscular strength and lifting ability vary within the same sex.

Many of the jobs kept from women because of the required need for physical strength are also dangerous for male workers (Messing, 1982). In fact, in many occupations "suitable" for women (nursing, for example) females are required to lift and carry very heavy loads (Ljungberg, 1989).

Flexibility

Flexibility is the "range of motion of a joint or a series of joints that is influenced by muscles, tendons, ligaments, bones, and bony structures" (Anderson, 1991). Most authorities consider flexibility one of the most important factors in the prevention of musculoskeletal injuries (Anderson, 1991; Arnheim, 1985; Wilmore, 1988). Although flexibility is joint specific, females generally are more flexible than males (Wilmore, 1988).

Females are considered by many to be more susceptible to injury. However, there is no empirical evidence to support increased risk when women participate in physical activity and sport. Injury is related more to physical conditioning than to the gender of the participant (Wilmore, 1988). Recent research suggests that gender does not have an overwhelming influence on the ability of a female to perform hard physical work after age, build, state of training, and acclimatization are taken into account (Mackay, 1984).

Strength, endurance, and flexibility should be considered in the safety of both female and male workers (Messing, 1982; Snook, 1974). In addition, load factors, individual physical characteristics, and environmental factors should also be considered (Haisman, 1988; Ljungberg, 1989).

Strategies for improving methods for worker placement, physical fitness, and the work environment must be developed to meet the national objectives for reducing work related injury.

INTERVENTIONS TO PREVENT INJURY

Both gender differences and individual differences within each sex should be addressed when considering worker safety and health. A worker's physical capacity and inappropriate ergonomic conditions in the workplace are reported to be responsible for a high incidence and prevalence of musculoskeletal injuries to workers (Kilbom, 1988; U.S. Department of Health and Human Services, 1986).

Physical Considerations

Strength and flexibility are human factors that can protect a person from being injured when performing a strenuous job (Keyserling, 1980). Assessments of strength, flexibility, and endurance should be done prior to job placement. In addition, results from the assessment could be used to provide counseling for improving fitness. Assignment to specific jobs would then be made by physical ability rather than by gender.

Although it is not clear whether women can develop muscle mass equivalent to that of men, research does suggest that women can improve their ability for strenuous jobs by modifying lean body weight (Hosler, 1982) and by participating in a physical training program to improve physical fitness (Genaidy, 1991). In addition, pre-work stretching programs have reduced the incidence of musculoskeletal injuries by improving muscle elasticity, increasing range of motion, increasing blood flow, and enhancing neurological response (Anderson, 1991; Hilyer, 1990; Smith, 1990). In general, exercise should be an integral part of a job training program for both males and females.

Ergonomic Considerations

Although selection, training, and placement of the female according to physical capacity is essential, design of the workplace is also important. Ergonomics means "putting an optimally healthy person into an optimal working situation" (Boudri, 1985). Ideally, stressful jobs could be redesigned to reduce strength demands. Kilbom (1988) stresses that ergonomic improvements are

more important in reducing musculoskeletal injuries than preemployment strength testing or employee training techniques.

For jobs filled primarily by male workers, the workplace is designed for the male body (Messing, 1991). Changes must be made in the design of work stations, tools and equipment, work organization, load positions and sizes, task demand, and protective clothing and shoes (Frederick, 1984; Messing, 1991). In addition, instruction for posture and strategies for lifting should be included in ergonomic considerations for both men and women. Women become more at risk for injury because of additional home duties that require lifting (Ward, 1984).

An Interdisciplinary Approach

With more women entering jobs designed for male workers, interventions to improve worker fitness and worker environment are key elements in promoting health, safety, and comfort. An interdisciplinary team of occupational health nurses, engineers, safety professionals, management, and others is needed to provide the ideas for fitting the worksite environment to the female worker.

The occupational health nurse is knowledgeable about individual and work environment assessment. The occupational health nurse is valuable in the prevention of injuries or early detection of injuries. Pre-job placement screening, health history, and physical examination are essential to detect risk factors as well as preexisting conditions.

The nurse as a health educator has an important role in ergonomic training programs, including fitness and weight control, working postures, and back protection. The nurse's knowledge of body function and positions and the dynamics of person and environmental interactions will assist engineers and safety personnel in determining the design of equipment, work stations, and loads.

Engineers and safety personnel are valuable for designing the work environment to accommodate the female worker. Injury data, workplace measurements, and task observations are all necessary to target and resolve problems that might place women at risk.

The employer is responsible for providing a safe and healthy work environment. When ergonomics is not feasible, the selection, training, and placement of employees is essential (Boudri, 1985). Every employee must be involved in ergonomics as a strategy for preventing musculoskeletal injury. Management support for adjusting the work environment for all employees is essential for assessment strategies, program development, and making necessary ergonomic changes.

CONCLUSIONS AND RECOMMENDATIONS FOR RESEARCH

Protected by legislation, encouraged by grassroots women's groups, and financially in need of higher paying jobs, more women are entering jobs once held only by their male counterparts. Although gender differences do exist, it is unclear whether these differences place women at a greater risk for musculoskeletal injury. Lifting heavy objects, and other working conditions that require strenuous physical activity, are used to justify the exclusion of women. However, men also experience a large number of musculoskeletal injuries in the workplace.

Few studies compare female and male musculoskeletal differences, and job specific comparisons are almost nonexistent. Studies that examine both differences and similarities should be carried out to improve the workplace design for manual handling tasks for both female and male workers.

More data related to the physical capacities of women should be collected and examined, and should include studies on strength, flexibility, and endurance. Specifically, studies should focus on the physical ability of women to work in traditional male jobs. Longitudinal studies that include musculoskeletal injury data and women's adaptation to strenuous physical work also are needed. Another topic for research is the need for clinical screening methods that improve the matching of workers to specific jobs. Finally, intervention studies that examine both the male and female employee should be done. Physical fitness and ergonomic programs for controlling occupational musculoskeletal injuries in the workplace should be examined for effectiveness.

Work related musculoskeletal injuries are a national priority. These injuries, the leading cause of disability, affect the quality of life of the worker, are costly, and are frequently an accessory or causal factor in acute traumatic injuries (U.S. Department of Health and Human Services, 1986).

Women will continue to move into jobs once reserved for males. Strategies for improving methods for worker placement, physical fitness, and the work environment must be developed to meet the national objectives for reducing work related injury.

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IN SUMMARY

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Is There a Risk for Musculoskeletal Injury?

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1. More females are entering once male dominated jobs that require physical strength, flexibility, and endurance.
2. Musculoskeletal injuries, a leading cause of worker disability, occur more frequently when the physical demands of a job exceed the worker's physical capabilities.
3. Although women are more flexible than men, differences in muscle mass, body composition, and size can place women at risk for injury.
4. The risk for musculoskeletal injury can be reduced through ergonomic considerations and physical fitness.

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